

6643-A-0398

Appendix K

Trainer Description for Device 2F200
MV-22B CONTAINERIZED FLIGHT TRAINING DEVICE (CFTD)
Serial Number 007, 008
Located at
MCAS FUTENMA, OKINAWA, JAPAN

1. TRAINER DESCRIPTION.

1.1 The devices are located on concrete pads near building 611. The device is fully self-contained within an enclosure and, when disassembled, is capable of being transported via land, air and sea. Within the enclosure there is a dedicated brief/debrief area that has as a part of the trainer a SMART Board overlaid onto a 52" LCD monitor with PC. The SMART Board/monitor and PC are utilized by aircrew for training. Overall the trainer provides replication of crew stations of the MV-22B aircraft in an interactive, real-time simulation environment for crew and individual aircrew systems training. The device system elements are comprised of both actual and simulated aircraft equipment, operating with a visual image generator and a collimated visual display system. The image generator utilizes a high fidelity set of airframe and avionics models.

1.2 Per the Marine Corps Aviation Simulator Master Plan (MCASMP) specification these trainers will maintain a full mission capability of 95% of expected training time. The CFTD focus is the training requirements of the post Fleet Readiness Squadron (FRS) aviator. The device fully supports all simulator training events of the Training and Readiness (T&R) syllabus for the MV-22B and replicates the MV-22B aircraft. The CFTD interfaces with other simulators via the Marine Corps supplied Tactical Environmental Network (TEN) using High Level Architecture (HLA) compliant network protocol. The CFTD provides training in procedures, tactics, and threat evaluation per the Training and Readiness Manual. Training tasks include, but are not limited to, day/night shipboard and field takeoffs and landings, aerial refueling, instrument flight procedures, departure procedures, spin procedures, radar system navigation, formation flying, combat maneuvering, weapons delivery and night vision goggle training.

1.3 The CFTD provides a means for evaluating tactical procedures and maneuvers against specific threat environments. Aircrew skill training includes all systems modes of operation and proficiency in the use of controls and displays required by the mission objectives. The CFTD is interoperable, through the Marine Corps supplied TEN, to support training in the full mission spectrum from planning through debrief.

2. FUNCTIONAL DESCRIPTION.

2.1 TRAINEE STATION. The Trainer cockpit is a full-scale replication of the MV-22B aircraft. Direction and movement of controls and switches are identical to those of the aircraft and shall simulate all cockpit instrument indications automatically in response to control movement by a crewmember, simulated aircraft performance, instructor-inserted actions, or external simulated environmental effects, such as turbulence or wind shear. All displays, instruments, panel assemblies, switches, levers, knobs and lights of the trainee station are provided to replicate the form, fit, function, feel and finish of the aircraft; replicate both the

6643-A-0398

Appendix K

static and dynamic responses and be compatible with night vision devices (NVD).

2.1.1 COCKPIT RECORDING. The trainee station is monitored by a digital video system with a minimum of two hours recording capability. Further, the capability to transfer cockpit recordings to a removable medium usable by fleet squadrons is provided. Coverage is sufficient to record aircrew movements during normal operation.

2.1.2 INTERCOM SYSTEM. There is an intercom system provided for communication between the following positions:

- a) Pilot
- b) Co-pilot
- c) Instructor
- d) Observer(s)
- e) Debrief Station
- g) Maintenance Intercom System
- h) Phone Line

The aircrew interfaces to the intercom system through the aircraft ICS panels and switches using standard issue headgear, making the use of the intercom transparent.

2.1.3 AUDIO SYSTEM. The audio system consists of a commercial system interfaced to the host computer. The audio system supports switching, mixing and volume control for the trainees and IOS operators, and provides feedback to trainees and trainers regarding simulation events such as normal aircraft operational noises, missile launch, crash, malfunctions, etc. The network supports audio data transfers to/from the computational system as part of the Ownship Network.

2.1.4 DEBRIEF STATION. An area to debrief pilots after a simulator mission "off-line" while a simulator training session is being conducted is provided in nearby facilities.

2.2 INSTRUCTOR OPERATOR STATION. Forward facing the station provides an adequate view of the instrument panels and the visual system. This allows observation of the activities of both aircrew students positioned in their seats. The station monitor displays and controls allow the instructor to interact with crew in an over-the-shoulder concept of instruction. The station consists of two flat panel touch screens, control keyboard.

2.3 INSTRUCTOR CONTROLS. Instructor/operator controls enable control of all required system variables and insertion of abnormal and emergency conditions into the simulated aircraft systems. The IOS contains all relevant control features necessary to accomplish simulator training specified in the T&R manual. The instructor position need not be occupied for operation of the trainers.

2.4 COMPUTER SYSTEM(S) and PERIPHERALS. The Input-Output system consists of VME chassis containing 128-bit high voltage Discrete Input cards, 128-bit high voltage Discrete Output cards, 64-channel latching Analog Input cards, 32-channel Analog Output cards, 32-channel Relay Card and 2-channel

6643-A-0398

Appendix K

synchro cards. The system will contain 10% spare capacity for future expansion.

2.4.1 TACTICAL ENVIRONMENT NETWORK (TEN). The Trainer is networked to a Government furnished Tactical Environment Network (TEN) database via the Local Area Network (LAN) using High Level Architecture (HLA) protocols. The TEN allows for a diversified and complex gaming environment for such role-playing scenarios as ground artillery, naval gunfire, air-to-air attack, etc. The user interfaces through the Tactical Operators Station (TOS) where human pilots training/gaming is controlled. The TEN allows data transfers to/from the computational system as part of the HLA Network, and is capable of receiving/sending HLA data from the HLA WAN. The TEN is the central interface between the MV-22 CFTD and other trainers. The hardware components of the TEN consist of a computer, host interface cards, TOS interface, LCD display, Man In The Loop Control (MITLC) joystick, keyboard, mouse and a headset for communicating with the pilots.

2.5 SHARED MEMORY. N/A

2.6 AIRCRAFT COMMON SUBSYSTEMS. N/A

2.7 POWER SYSTEM (e.g., cycle, voltage, UPS, power filters etc.). The Trainer Power System provides the AC and DC power to all functional trainer systems listed in paragraphs 2.8 through 2.13. The trainer is configured with an Uninterruptable Power supply (UPS) manufactured by Staco Energy Corp.

2.8 CONTROL LOADING SYSTEM. Control loading replicates all the mechanical linkages, sensors, signal conditioning, computational resources, and software required to duplicate the form, fit, function, feel, and finish of the MV-22B aircraft force feel system as perceived by the pilot. The end-to-end system response is the same as the aircraft. The control loading system utilizes a commercial off-the-shelf hardware system with software tuned to the MV-22 CFTD specification requirements. It consists of 8-force loader units, a control loading PC with automated control force measuring system software installed, and interfaced to the host computer. The control force system duplicates the force feel and mechanical characteristics of the aircraft force feel system in all modes of ground and flight operations, for both normal and emergency conditions.

2.9 VISUAL/VIDEO SYSTEM(S). The Image Generator (IG) is manufactured by Aechelon. It provides high fidelity images for viewing by the aircrew with a Field of View (FOV) adequate to train all tasks and supports training events for both helicopter and fixed wing operations. The IG is Aechelon's pC-NOVA for five channel Liquid Crystal on Silicon (LCOS) projector system that provides Out-of-The-Window (OTW), Night Vision Goggles (NVG) and Forward Looking Infrared (FLIR). The IG is a PC hardware/Windows XP environment projected onto a wrap-around mirror bowl.

2.10 MOTION SYSTEM(S). N/A

2.11 AIR CONDITIONING SYSTEM/ENVIRONMENTAL SYSTEM(S). The trainer is

6643-A-0398
Appendix K

configured with two individual dual unit air conditioners model P1060A1-B/H manufactured by BARD Corporation.

2.12 MOTOR GENERATOR SET(S) (e.g., inverters). The trainer uses an AC Power regulated/frequency converter BL3300 manufactured by Behlman Corp.

2.13 HYDRAULIC/PNEUMATIC SYSTEM(S). N/A

3. **ILLUSTRATIONS.** Note: For system/subsystem drawings and documentation, refer to Operational and Maintenance Manuals located at each site.

4. **CONTRACTED TRAINING TIME (CTT) – FUTENMA.**

Training Operations shall be provided in each FY as per exercised contract CLIN/SLIN per device from one of the stair steps below:

2F200-7/8 MV-22B Containerized Flight Training Device (CFTD)			
Contracted Training Time (CTT) Monday thru Friday (M-F)			
MCAS Futenma, Okinawa			
Hours per Day (HPD)	Hours per Week (HPW)	Start Time (local) (Notional)	End Time (local) (Notional)
2	10	1000	1200
4	20	0800	1200
6	30 ³	0800	1400
Remark (s) / Note (s)			
1-CTT time represents continuous hours of device operational training availability from initial START time.			
2-CTT does not include weekend (Saturdays/Sundays) training, and no weekend training planned.			
3-CTT daily Start Times are notional and may vary/shift with coordination and direction from the Contracting Officer's Representative (COR)/site scheduling authority and may change during the course of the Task Order. (Refer to Addendum A, paragraph 4.3.1).			
4-CTT may be shifted between devices with coordination and direction from the Contracting Officer's Representative (COR) and Contractor Site Manager.			
5- The Government does not anticipate utilizing either trainer more than 8 hours in a training day; however, both CFTD devices will have a combined 30 HPW CTT: 20 hours for S/N 007 and 10 hours S/N 8 respectively the Government reserves the right to transfer training hours between devices as long as the total does not exceed combined CTTs.			
Table 4.1			

5. **GOVERNMENT PROVIDED AIRCRAFT COMMON EQUIPMENT (ACE) /TRAINER UNIQUE EQUIPMENT.**

5.1 Aircraft Common Equipment (ACE)

6643-A-0398
Appendix K

Complete list of ACE can be found in the inventory list provided at each site.

The Material Support Package (MSP) inventory of this solicitation will be determined by the results of CDRL A005 "COMS/CMS CONTRACTOR INVENTORY/UTILIZATION REPORT OF GFP/GFI". The results of the transition inventory will be verified and signed by the site COR prior to Contractor's submission of CDRL A002 to the Government.

NOTE: Whenever minor configuration changes, calibration or adjustment of aircraft common equipment is required for use in the trainer, such information shall be provided in this Appendix.

5.2 Trainer Equipment. Depot level (D-level) maintenance for the following trainer equipment is the responsibility of the government.

Complete list of D-level trainer equipment will be provided at each site.

5.2.1 Trainer Support Package (TSP): Includes Tools/Support Equipment, Spare Parts, Technical Data Support Package, and Software Support Material. The formal inventory (i.e. tools/support equipment, spare parts, technical data support package, and software support material, etc.) shall be those items identified during the mobilization period and stated in the yearly Inventory/Utilization Data Report. The Contractor shall comply with the development, maintenance and submission requirements for this report, as stated in the applicable CDRL item."

6. **GOVERNMENT FURNISHED PROPERTY (GFP) INVENTORY.** The formal inventory (i.e. tools/support equipment, spare parts, technical data support package, and software support material, etc.) shall be those items identified during the mobilization period and stated in the yearly Inventory/Utilization Data Report. The Contractor shall comply with the development, maintenance and submission requirements for this report as stated in the applicable CDRL item.

7. **PARTIAL MISSION CAPABILITY STANDARD (PMCS).** Partial Mission Capability (PMC) is the material condition of a training device that cannot perform all of its missions. PMC levels are described by Equipment Operational Capability (EOC) codes, which relate to a particular system/subsystem to a specific mission. The EOC code also relates to the percentage of deduction from the authorized payment for the affected period. See Table 3 for PMCS deduction schedule.

EOC	% MISSION CAPABLE	% OF DEGRADATION
B	100	0
C	90-99	10
D	80-89	20
E	70-79	30
F	60-69	40
G	50-59	50
H	40-49	60
J	0-39	70

6643-A-0398
Appendix K

Table 3

7.1 ESSENTIAL SUBSYSTEMS/CONDITIONS REQUIRED FOR TRAINING EVENTS.

Failed Sub-system	
Component	% Degradation
Any VMS Component	100%
IOS	100%
EICAS	100%
Visual	92%
MDL	27%
DIGIMAP	30%
BASIC INAV (GPS/INS)	34%
EW SUITE	16%
LEFT MFD	100%
RIGHT MFD	23%
FD	97%
BASIC ENAV	24%
MOTION	20%
AURAL	20%
FLIR	38%
TEN	26%
NVG HUD	22%
SFD	96%
BASIC MOVING MODELS	11%
LEAD SHIP REC/PLAYBACK	4%
RADALT	93%
DEBRIEF STATION	10%
LEFT RFIS	100%
RIGHT RFIS	23%
STANDBY INSTRUMENTS	7%
NETWORKED PLAYERS	19%

1. This matrix is based on the current T&R Syllabus Vol 8. Revisions of the T&R Syllabus will drive changes to this MESM
2. The COR shall assign PMC status in the event of a system failure not listed above based on the impact to training. The PMC factor shall not exceed 10%.

8.0 JANITORIAL SCHEDULING REQUIREMENTS See Appendix AA